"USDA NRCS Technology News" ~ December 2000

United States Department of Agriculture
Natural Resources Conservation Service
Science and Technology

"USDA NRCS *Technology News*" is a monthly electronic information piece provided by Science and Technology. It is designed to deliver pertinent information to our customers about new technology, products, and services available from the Soil Survey and Resource Assessment and the Science and Technology deputy areas. **"USDA NRCS *Technology News*"** is in a format that is available to all NRCS field staff.

Features in this issue include:

NRCS Team Receives Award From United States Army

MESSAGE FROM THE DEPUTY CHIEFS
Lawrence E. Clark and Maurice J. Mausbach

Recent visitors to National Headquarters posed a challenging question to Agency leaders who met with them, "What will the impact of agricultural biotechnology be on limited resource and minority farmers, and what will be the role of NRCS in providing technical assistance to them?" The question can actually be interpreted in two ways. First, what are the possible impacts on limited resource farmers in the U.S. who adopt the new technologies and use them on their farms? Secondly, what are the implications of biotechnology for limited resource farmers in developing countries around the world?

Unfortunately, while thousands of pages of research have been written on the topic of agricultural biotechnology, research on the social impacts of these technologies on American family farmers is nonexistent. Somewhat more is known about potential impacts on farmers in developing countries. It is possible that we know more about the impacts of biotechnology on birds and butterflies than we do about the effect that adopting biotechnology will have on people! Secretary Glickman recognized this in a speech before the National Press Club when he said:

"The important question is not, do we accept the changes the biotechnology revolution can bring, but are we willing to heed the lessons of the past in helping us to harness this burgeoning technology. The promise and potential are enormous, but so too are the questions, many of which are completely legitimate. Today, on the threshold of this revolution, we have to grapple with and satisfy those questions so we can in fact fulfill biotechnology's awesome potential." ("New Crops, New Century, New Challenges: How Will Scientists, Farmers, and Consumers Learn to Love Biotechnology and What Happens if They Don't?" Remarks prepared for delivery before the National Press Club on July 13, 1999.)

Based on the existing research, it is probably safe to assume that some of the projected impacts of biotechnology might be the same for small farmers as for larger farms. These include less pesticide use, improved weather resistance, and higher productivity. In addition, it is possible that smaller farmers may also have a market edge, in the sense that they can address public concerns regarding biotech foods with organic crops, or focus on specialty crops and/or direct marketing. Some specific innovations may also be beneficial, such as the development of stress-tolerant plants that can thrive on marginal land and increase productivity on land often farmed by low-income and minority farmers. The Secretary acknowledges that "one of (his) biggest concerns is what biotechnology has in store for family farmers."

"We need to examine all of our laws and policies to ensure that, in the rush to bring biotech products to market, small and medium family farmers are not simply plowed

under. We will need to integrate issues like privatization of genetic resources, patent holders rights and public research to see if our approach is helping or harming the public good and family farmers." (Ibid.)

But what is the role of NRCS? In the words of one author who has written on the future of conservation: "Since we have no choice but to be swept along by this vast technical surge, we might as well learn to surf." (Michael Soule, in Western, David and Mary C. Pearl, *Conservation for the 21st Century*, 1989).

In the near future, we probably will not be helping the farmer make decisions about what bioengineered crops and animals to grow or how to grow them. Our mission focuses on conservation of natural resources—in this case, conservation relative to biotechnology. Integrating these two components into a role for the Agency that supports limited resource and family farmers is the challenge that needs to be addressed. We might consider the following:

- Scientific and technical studies on the relationship between agricultural biotechnology and natural resource protection, particularly in regard to small and minority farmers.
- Additional or enhanced practice standards and soils information for technical assistance on erosion prevention and water quality for specialty crops, such as gourmet vegetables, ethnic foods, and organic foods.
- Information and assistance on specific biotechnology developments that are "environmentally friendly" and suitable for application by minority and limited resource farmers.

It is incumbent on all of us to be well informed regarding biotechnological development, and sensitive to the implications for natural resource conservation. Next month's column will examine some of the implications of biotechnology for developing countries. As Secretary Glickman notes, "We don't know what biotechnology has in store for us in the future, good and bad, but if we stay on top of developments, we're going to make sure that biotechnology serves society, not the other way round."

CONSERVATIONIST'S CORNER
Ronald Williams, State Conservationist, Michigan

The Natural Resources Conservation Service is a technical agency. NRCS exists to provide the best available natural resource management technical assistance to America's land use decision-makers in a timely and efficient manner. NRCS Centers and Institutes support the development and transfer of technology that will enable NRCS staff to carry out that mission.

The array of Centers and Institutes serving the soils arena provides invaluable service with a host of training, products and other materials. The National Soil Survey Center has assisted Michigan NRCS soils staff to create a Soils Data Viewer for one county in

Michigan. The Soil Quality Institute has provided training and information on maintaining soil quality in the state. The technical notes on soil quality and urban soils are used and considered helpful tools. The National Soil Survey Laboratory provides analytical support to our soil survey project offices, conducting needed physical and chemical analysis and providing Michigan with laboratory data for the state's on-going work on sampling soils for carbon sequestration.

The National Cartography and Geospatial Center provides technical support to Michigan's Soil Digitizing Center, soil survey mapping field imagery for Michigan's soil survey project offices, and needed map compilation material (DOQ's, etc) for soil survey project offices.

The Social Sciences Institute (SSI) has been actively working with Michigan State University and Michigan State University Extension (MSU-E) to develop and transfer social sciences technology for national use by the entire conservation partnership. These products and services include the nine module training program "Developing Your Skills to INVOLVE COMMUNITIES in Implementing Locally Led Conservation." One or more training modules have been used to train approximately 1,500 MSU-Extension, Michigan Department of Agriculture, Michigan Groundwater Stewardship Program, and NRCS employees. The Michigan Association of Conservation Districts has utilized six of the locally led conservation modules for training directors and staff. Additional training sessions utilizing these excellent materials will be offered again in 2001.

Other materials developed by the Social Sciences Institute are used as an integral part of the Basic Conservation Planning course, which is one of Michigan's requirements for obtaining conservation planner certification. The "Using Financial Budgets in Conservation" and "Cost-effectiveness Analysis" fact sheets in the Institute's People, Partnership and Communities series are used to raise awareness of the economics involved in conservation planning. NRCS Michigan field staff has served as reviewers of other fact sheets in the series.

Michigan NRCS staff has contributed a great deal to the development and transfer of technology both within the state and to other states as well. Many Michigan NRCS specialists work closely with staff in the various centers and institutes in their discipline area to develop or adapt technology specific to the needs of Michigan. With numerous projects ranging from remediation of the copper mine tailing erosion at the Torch Lake Superfund Site, streambank stabilization using bioengineering techniques, innovative models for utilizing manure, to agrichemical containment facilities, Michigan strives to stretch the possibilities of technology development to meet the needs of our customers. The collaboration of the centers and institutes with the expert staff in NRCS offices throughout the country will serve the customers and our natural resource base in the most beneficial manner.

NEW PRODUCTS AND SERVICES

Gully Stabilization Publication now Available

A 5-year study to stabilize four severely eroding North Florida gullies by using vegetative means is summarized in a new fact sheet. The Brooksville, Florida, Plant Materials Center (PMC) has released "Gully Stabilization in North Florida." Three sites had grade stabilization structures in place, but continued to erode because of high volume and velocity. These sites had peak discharges from a 10-year, 24-hour storm of 90 cubic feet per second to in excess of 180 cubic feet per second. The species of plants used on each site was determined by the contour of the gully and the volume and velocity of the projected runoff. Nine plant species were used in the study at the various sites. This fact sheet may be obtained from the Brooksville PMC or from the web site at: http://www.nhq.nrcs.usda.gov/BCS/PMC/pubs/flpmcbrgullyst.pdf

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San Juan Germplasm Narrowleaf Penstemon Released for the Southwest

There is a selected release of a narrowleaf penstemon in the Southwest. The narrowleaf penstemon is named San Juan Germplasm, and the release was collected in the Four Corners region. The New Mexico Plant Materials Center, in cooperation with the Agricultural Science Center at New Mexico State University in Los Lunas, announces the release.

The plant is adapted to areas with annual precipitation of 6 to 10 inches, and has a variety of purposes. It helps prevent erosion on the sandy dunes, plains, and grasslands where it establishes. The beautiful flowers it produces in the early spring make it useful for xeriscaping. The seed of narrowleaf penstemon provides a food source to small birds and mammals. The flowers are particularly important in providing early forage for honeybees. Hummingbirds and various insects also rely heavily on the flowers in the early spring.

Foundation and breeder seed of San Juan Germplasm may be obtained by contacting the New Mexico Plant Materials Center or the New Mexico Crop Improvement Association.

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Social Aspects of Urban Resources Partnership Projects Reviewed

During October, 2000, Frank Clearfield, Director, Social Sciences Institute, provided assistance to the NRCS's Management Services Division in identifying the social impacts of Urban Resources Partnership (URP) projects in select communities. The URP projects are a combination of Forest Services and NRCS efforts to provide forestry and soil and water conservation assistance to communities in urban areas. Although there are a wide variety of urban projects, the positive benefits to community institutions and local residents are similar to those benefits achieved in rural agricultural settings. Observing this type of impact in urban settings adds justification to the expanded role being played by NRCS.

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TECHNOLOGICAL ADVANCES

Switchgrass Research Underway as a Biofuel Source

Interest in switchgrass (*Panicum virgatum*) as a renewable biofuel resource has been increasing in recent years, primarily in the Southern United States. The Booneville, Arkansas, Plant Materials Center (PMC) and the Plant and Soil Science Department of Oklahoma State University (OSU) are cooperating to evaluate several upland types of switchgrass for use as a biomass energy resource.

Selections of upland types of switchgrass have been evaluated by OSU for several years. The development of hybrid progeny with substantial heterosis for increased biomass yield will ultimately result in improved hybrid cultivars for the Central and Southern United States. The PMC is in the process of assessing several improved lines along with commercially available cultivars for dry-matter potential and environmental adaptation. Results of this study may contribute to producers cashing in on a growing demand for renewable fuels and a decrease on our dependency on fossil fuels.

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TECHNOLOGY TRANSFER

New York City Watershed Participates in Corn Cover Cropping Project

A corn cover crop project was conducted on a farm in the New York City Watershed in Delaware County. Alfalfa, red clover, white clover, and perennial ryegrass cover crops were established at time of corn planting and were kept in control by use of herbicides. A rainfall simulator will be used to obtain runoff from the plots, and the runoff can then be monitored. Corn and cover crop yields will be measured as well.

The Big Flats Plant Materials Center is collaborating with the USDA, the Agricultural Research Service, Watershed Management Research Lab in Pennsylvania, and Cornell University on the project. Alfalfa samples, including many named varieties and some research lines, were obtained and will be analyzed for differences in phosphorus content. The analysis results will determine if there is a genetic component in alfalfa for phosphorus uptake. The intended outcome is an alfalfa variety that can be recommended for high phosphorus soils.

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Water Resources Technical Group Working to Improve Products and Services

The National Water and Climate Center (NWCC), National Water Management Center (NWMC), and Watershed Sciences Institute (WSSI) formed the Water Resources Technical Group in 1998. The group was created under the direction of the Director of the Conservation Engineering Division to improve water-related products and services available to state and field offices, partners, and other customers.

Directors from each entity participated in meetings with regional/state conservationists and technology specialists in the six regions to provide information and solicit input regarding priority needs. Based on priorities identified at these and other sessions, the Institutes/Centers are functioning as follows:

- WSSI – technology development regarding issues at the watershed/landscape scale (nutrient management, pathogens, bacteria, buffers, riparian corridors, watershed condition, sustainable agriculture, and wildlife habitat). For more information on WSSI you can go to the web site at: http://gneiss.geology.washington.edu/~nrcs-wsi/

- NWCC – technology development for water quality (animal waste, nutrient and pest management), hydrology models and dam safety, water management and irrigation, and snow, climate, and soil moisture data acquisition and management, and forecasts of water supply and drought risk. For more information on NWCC you can go to the web site at: http://www.wcc.nrcs.usda.gov/

- NWMC – direct assistance to states utilizing technology currently available (nutrient management/manure management, irrigation water management, ground water, environmental compliance, hydrology/hydraulics, and watershed planning and rehabilitation) For more information on NWMC you can go to the web site at: http://wmc.ar.nrcs.usda.gov/

The directors work closely together to provide the best possible use of the limited water resources expertise available. They jointly establish and utilize expertise available through partners and procured expertise. They also meet approximately two times per year to coordinate with others in Science and Technology and programs that are interested in water resources, coordinate strategic and operational plans, and inform each other of emerging issues/technologies.

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Science & Technology Exhibits at ASA Meeting

The NRCS Science and Technology exhibit at the American Society of Agronomy meeting was a huge success. Several thousand products, produced by institutes, centers, and divisions in Science and Technology, were distributed. In addition, attendees requested over 400 products and services provided by NRCS Science and Technology. There was high demand for the Dominant Soil Orders and Suborders- Soil Taxonomy 1998 poster, The Colors of Soil poster, the Soil Taxonomy CD, the STATSGO CD, as well as other products.

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NRCS Provides Assistance to Nigeria

A team of experts from USDA, including Michael Sucik, representing NRCS Science and Technology, traveled to Nigeria recently to evaluate agriculture and land use. In conjunction with Nigerian officials, they explored ways in which Nigeria can develop an agriculture program that ensures an adequate and sustainable food supply and sustainability through improved land use practices.

The team visited technological facilities and areas of the country that face adverse conditions, such as canyons caused by accelerated gully erosion and failed engineering structures.

The findings of the trip included the need for an updated soil survey of Nigeria. High resolution aerial photography technology would benefit the updated survey, improving upon the current 1:250,000 aerial photographic imagery scale. Other issues to be addressed include issues of soil fertility testing, soil conservation and soil erosion, and providing technical training to Nigerian scientists.

Three NRCS soil scientists are scheduled to return in February 2001 to meet with officials and farmers and evaluate soil survey information.

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TRAINING

First Annual Agricultural/Water Management Field Day

The University of Arkansas at Pine Bluff (UAPB), NRCS, National Water Management Center, and conservation partners hosted the first Small Farm Outreach Wetlands and Water Management Center Field Day at UAPB's Lonoke Farm on August 31. Topics included crop production systems, water management activities, and other ag-related activities.

More information about the field day is available at the NWMC web site http://wmc.ar.nrcs.usda.gov. NWMC specialists provide assistance with water management activities including field trials, demonstrations, training, and technology transfer.

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Climate Change Workshops Scheduled

Several workshops are being held around the country this winter to meet the demand for technical expertise on global environmental changes.

The potential to mitigate climate change by sequestering carbon in soil is of interest to many. Sequestering carbon is not new to the conservation partnership. Practices that increase soil organic matter have been promoted for some time. Is there a need then to change local responses? How should the conservation partnership adapt to climate and other environmental changes? Local leaders need to respond to these questions. The science and policy behind them is multifaceted, uncertain, and still developing.

The workshops are to be presented by representatives of the National Association of Conservation Districts and NRCS including the Soil Quality Institute. The goal of the workshops is to provide information to state level conservation partners about the concepts and principles of global change, and to help them develop local responses.

For more information about the workshop in your region, contact your regional technology coordinator.

For more information, contact:

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Plant Materials Workshop Held for Native American Nations

The Big Flats Plant Materials Center (PMC) and New York Sea Grant hosted a plant materials workshop for Native American Nations at the PMC on September 13, 2000. Indian Nations from throughout New York State learned more about the Plant Materials Program, the New York Sea Grant Program, and the American Indian Agriculture Program at Cornell University. The participants toured the PMC, which highlighted

conservation plants and field projects. After the tour, the group worked with sweetgrass, which is a culturally significant plant for Native Americans. Everyone had a hands-on experience of separating sweetgrass and potting up the plant divisions. They were then able to take these plants back to their tribal lands to establish propagation nurseries.

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MEETINGS

Environmental Justice Featured at Agricultural Workers Conference

The 58th Professional Agricultural Workers Conference at Tuskegee University will include several Social Sciences Institute (SSI) presenters on the topic of environmental justice. The conference takes place December 3-5 at the Kellogg Conference Center, Tuskegee, Alabama.

Frank Clearfield, Director of the Social Sciences Institute, is moderating a session called "Environmental Justice: What Agricultural Professionals Can Do." Kim Berry, SSI sociologist, is presenting a paper titled "Environmental Justice: Perceptions of Issues, Awareness, and Assistance." A copy of the paper can be accessed at http://people.nrcs.wisc.edu/socsciinstitute/pdfFiles/EJReportModified.PDF

Dr. Joseph Molnar, professor from Auburn University, is presenting information on Core 4 adoption among low income and minority farmers in Mississippi, Alabama, and Georgia. Gail Brant, SSI sociologist, sponsored the project. A report will soon be completed and distributed throughout the Agency.

Rounding up the session, Andrew Williams, Outreach Coordinator, Alabama, will present information on Environmental Justice from the state's perspective. Maxine Barron, Director of the NRCS Outreach Division in Washington, D.C., will discuss outreach issues from a national perspective.

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HONORS

NRCS Team Receives Award From United States Army

The "Army of Partners: Conservation Team" has been selected to receive Vice President Gore's Hammer Award. The team members include NRCS employees representing Science and Technology. The Army contracted with NRCS to provide personnel to coordinate natural resources conservation planning and activities worldwide. Angel Figueroa, resource conservationist, has worked primarily on invasive species management. He is also helping the Army develop a Clean Water Action Plan. George Teachman, soil scientist, coordinated soil surveys for 3 million acres of Army land that were previously unmapped. Dave Lorenz, plant materials specialist, has developed technology enabling the restoration of Army land with plant materials.

The Hammer Award is presented to teams of federal employees who have made significant contributions in support of reinventing government principles. The award honors the Conservation Team partnership program of the United States Army Environmental Center, a program that has helped the Army more effectively and efficiently manage our natural and cultural resources.

The award will be presented during the first Army Worldwide Environmental and Energy Conference 2000, December 5-7, 2000, in Atlanta, Georgia.

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USDA NRCS TECHNOLOGY NEWS

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